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The first lamp 12 is connected to the second contact 53 in the light source energizing circuit, and the second lamp 12 is connected to the third contact 75 in that light source energizing circuit 20.

The above mentioned part 54 of the switch may have a fourth contact 18 in the light source energizing circuit 20, and the first lamp 12 is then connected between the second and fourth contacts 53 and 18, such as by wires 58 and 59, whilst the second lamp 13 is connected between the third and fourth contacts 75 and 18, such as by wires 72 and 73.

Where the reflector module 17 is threaded to the module support 31 for rotational and axial movement relative to that module support, the first position is a first rotational and axial position 45 of the reflector module 17 relative to its module support 31, the second position may be a second rotational and axial position 46 or 47 of that reflector module relative to its module support and the third position may be a third rotational and axial position of the reflector module relative to its module support.

When either of the first and second lamps burns out, the screw 55 is removed and the whole unit 12, 13, 18, 52, 53, 57, 69, 75, 78 is discarded and replaced by a like new unit. This will not only provide fresh lamps 12 and 13, but also fresh contacts at 18, 53 and 75 for superior long-time performance of the flashlight or other battery-operated apparatus 10.

This in contrast to the deteriorating performance from progressively corroding switch contacts and battery terminal contacts of prior-art flashlights.

Also, the replaced light bulb 12 or filament 112 will be as well focused as the light bulb or filament it replaces in the transducer mount 17 and reflector 36. For instance, when the replacement unit is manufactured, each bulb 12 may first be cemented or similarly fastened in a sleeve 81 and such sleeve may be mounted on the switch carrier 54, or in its hollow part 56, and the focus of the filament 112 may be checked and rechecked during such manufacturing procedure.

I claim:

1. Battery-powered apparatus for holding and energizing an electric transducer producing an output from a battery current, comprising in combination:
  - a transducer mount;
  - a hand-held battery housing carrying the transducer mount;
  - a first internal battery terminal contact at the transducer mount;
  - a second internal battery terminal contact remote from the transducer mount;
  - a first external battery charge terminal on the transducer mount;
  - a second external battery charge terminal on a part of the battery housing;
  - a double-throw switch having a common element electrically connected to one of the first and second internal battery terminal contacts, having a first switched contact leading to a first terminal of the electric transducer, and having an opposite second switched contact electrically connected to one of the first and second external battery charge terminals;
  - an actuator for said switch including one of said transducer mount and said part of the battery housing movable relatively to each other; and
  - current-conducting paths between the other of the first and second internal battery terminal contacts and the other of the first and second external battery charge terminals and a second terminal of the electric transducer.

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2. Apparatus as in claim 1, including:
  - a push-button actuator for said switch.
3. Apparatus as in claim 1, including:
  - a second switch in series with said double-throw switch and the electric transducer.
4. Apparatus as in claim 1, wherein:
  - said battery housing includes a barrel and an end cap movable relatively to the barrel; and
  - said movable end cap is said part of the battery housing having said second external battery charge terminal and being said actuator for the switch.
5. Apparatus as in claim 4, wherein:
  - said end cap is of electrically conductive material having an exposed portion constituting said second external battery charge terminal on an outside of said end cap and connected to said second switched contact through and by said electrically conductive material from an inside of said end cap to said exposed portion on said outside of the end cap.
6. Apparatus as in claim 5, wherein:
  - said end cap is electrically insulated from said barrel.
7. Apparatus as in claim 4, wherein:
  - said switch includes a switch actuating plunger having a manually engageable portion extending through an aperture in said end cap.
8. Apparatus as in claim 1, wherein:
  - said first external battery charge terminal is electrically connected through said transducer mount to said first internal battery terminal contact.
9. Apparatus as in claim 7, wherein:
  - said transducer mount is of electrically conductive material constituting said first external battery charge terminal on an outside of the transducer mount and connected to said first internal battery terminal contact through and by said electrically conductive material from an inside of the transducer mount to said outside of the transducer mount.
10. Apparatus as in claim 1, wherein:
  - said transducer mount is in the form of a block of electrically conductive material threaded to the battery housing and connected to said first internal battery terminal contact.
11. Apparatus as in claim 10, wherein:
  - said block of electrically conductive material has a reflector surface for the transducer.
12. Apparatus as in claim 10, wherein:
  - said transducer mount is electrically insulated from said battery housing.
13. Apparatus as in claim 1, wherein:
  - said switch actuator is threaded to the battery housing for rotary and axial movement relative to the battery housing; and
  - said common element is coupled to said threaded switch actuator and in electrical connection with the first switched contact and out of connection from the second switched contact in a first angular and axial position of the threaded switch actuator, and in electrical connection with the second switched contact and out of connection from the first switched contact in a second angular and axial position of the threaded switch actuator.
14. Apparatus as in claim 13, wherein:
  - said threaded switch actuator is a threaded end cap of said battery housing.

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15. Apparatus as in claim 13, including:

a push-button on/off actuator coupled to said common element in circumvention of said threaded switch actuator.

16. Apparatus as in claim 13, wherein:

said second switched contact has a conducting resilient portion; and

said double-throw switch includes an insulating spacer maintaining said resilient portion out of connection from said common element in said first angular and axial position of the threaded switch actuator;

said resilient portion acting on said insulating spacer; and

said threaded switch actuator releasing said common element into electrical connection with said conducting resilient portion in circumvention of said insulating spacer upon actuation to said second angular and axial position.

17. Apparatus as in claim 13, wherein:

said common element has a rest position between said first switched contact and said second switched contact in a third angular and axial position of the threaded switch actuator.

18. Apparatus as in claim 13, wherein:

said first switched contact is on a portion of the battery housing; and

said second switched contact is coupled to the threaded switch actuator.

19. Apparatus as in claim 13, wherein:

said battery housing has a barrel and said switch actuator is an end cap threaded on said barrel;

said first switched contact part is on an end of said barrel;

said second switched contact is in the threaded end cap; and

said common element is between said first and second switched contacts and is coupled to said threaded end cap.

20. Apparatus as in claim 1, wherein:

said electric transducer includes a first transducer element providing a first output, and a second transducer element providing a different second output; and

said electric transducer energizing circuit includes an at least two-position electric switch in series with said double-throw switch and with said first transducer element in a first position, and with said second transducer element in a second position of said at least two-position electric switch.

21. Battery-powered apparatus for holding and energizing a first electric transducer producing a first output, and a second electric transducer producing a different second output from a battery current, comprising in combination:

a hand-held battery housing mounting the first and second electric transducers and having a pair of spaced internal battery terminal contacts;

an electric transducer energizing circuit between the internal battery terminal contacts and the first and second electric transducers, including an electric switch, comprising a rotary switch actuator threaded to the battery housing for rotary and axial movement relative to the battery housing, a first switch contact part on the battery housing, a second switch contact part coupled to the rotary switch actuator and in electrical connection with the first switch contact part in a first angular and axial position of the rotary switch actuator, and out of connection from the first switch contact part in a

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second angular and axial position of the rotary switch actuator, and a third switch contact part coupled to the rotary switch actuator and in electrical connection with the first switch contact part in the second angular and axial position of the rotary switch actuator, and out of connection from the first switch contact part in the first angular and axial position of the rotary switch actuator;

said first switch contact part connected to one of said internal battery terminal contacts;

said first electric transducer having a first terminal connected to said second switch contact part;

said second electric transducer having a first terminal connected to said third switch contact part; and

said first and second electric transducers having second terminals connected to the other internal battery terminal contact.

22. Apparatus as in claim 21, wherein:

said second and third switch contact parts are out of connection from the first switch contact part in a third angular and axial position of the rotary switch actuator.

23. Apparatus as in claim 21, wherein:

said switch includes a switch contact actuator coupled to the third switch contact part and maintaining that third switch contact part separated from the first switch contact part in the first angular and axial position of the rotary switch actuator.

24. Apparatus as in claim 21, wherein:

said first and second switch contact parts have arcuate portions matching in the first angular and axial position of the rotary switch actuator.

25. Apparatus as in claim 21, wherein:

said third switch contact part includes a projecting electric contact in engagement with the first switch contact part in the second angular and axial position of the rotary switch actuator, and a switch contact actuator maintaining the projecting electric contact out of engagement from the first switch contact part in the first angular and axial position of the rotary switch actuator.

26. Apparatus as in claim 25, wherein:

said switch contact actuator projects from the third switch contact part toward the first switch contact part in mechanical engagement with the first switch contact part in the first angular and axial position of the rotary switch actuator maintaining the projecting electric contact out of engagement from the first switch contact part; and

wherein the second axial position of the rotary switch actuator is more remote from the first switch contact part than the first axial position of the rotary switch actuator whereby the switch contact actuator is in disengagement from the first switch contact part in the second rotary and axial position of the rotary switch actuator and the projecting electric contact of the third switch contact part is in electrical connection with the first switch contact part in that second angular and axial position of the rotary switch actuator.

27. Apparatus as in claim 21, including:

a rotary contact carrier coupled to the rotary switch actuator and bearing the second and third switch contact parts.

28. Apparatus as in claim 27, including:

said other internal battery terminal contact coupled to at least one of said rotary switch actuator and said rotary contact carrier.

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29. Apparatus as in claim 27, wherein:  
 said rotary contact carrier has an aperture;  
 said first, second and third switch contact parts are clear  
 of said aperture; and  
 said other battery terminal contact projects at least into  
 said aperture in the rotary contact carrier. 5
30. Apparatus as in claim 27, wherein:  
 said rotary contact carrier bears at least one of said electric  
 transducers. 10
31. Apparatus as in claim 21, wherein:  
 said rotary switch actuator is a transducer housing.
32. Apparatus as in claim 31, wherein:  
 said transducer housing is in the form of a block of  
 material threaded to the battery housing. 15
33. Apparatus as in claim 32, wherein:  
 said block of material constitutes a transducer output  
 reflector.
34. Apparatus as in claim 31, including:  
 said other internal battery terminal contact coupled to the  
 transducer housing. 20
35. Apparatus as in claim 21, including:  
 a push-button on/off switch in said electric transducer  
 energizing circuit.
36. Apparatus as in claim 21, including: 25  
 a reflector having a focal point;  
 said first electric transducer being a first electric lamp  
 having a filament at said focal point; and  
 said second electric transducer being a second electric  
 lamp extending into said reflector on a side of said first  
 electric lamp. 30
37. Apparatus as in claim 36, wherein:  
 said reflector is in the rotary switch actuator.
38. An electric light source, comprising in combination: 35  
 a reflector having a focal point;  
 a first electric lamp having a filament at said focal point;  
 a second electric lamp extending into said reflector on  
 a side of said first electric lamp; and  
 a refractive lens for said second electric lamp. 40
39. An electric light source as in claim 38, including:  
 a movable housing for said reflector and first and second  
 lamps;  
 said switching arrangement having a switch actuator 45  
 coupled to said movable housing.
40. An electric light source, comprising in combination:  
 a reflector having a focal point;  
 a first electric lamp having a filament at said focal point;  
 a second electric lamp extending into said reflector on a  
 side of said first electric lamp; 50  
 a battery; and  
 a switching arrangement interconnected between said  
 battery and said first electric lamp in a first position,  
 and interconnected between that same battery and said  
 second electric lamp in a second position of said  
 switching arrangement. 55
41. An electric light source as in claim 40, including:  
 a movable housing for said reflector and first and second  
 lamps; 60  
 said switching arrangement having a switch actuator  
 coupled to said movable housing.
42. An electric switch, comprising in combination:  
 a support; 65  
 a rotary switch actuator threaded to the support for rotary  
 and axial movement relative to the support;

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- a first switch contact part on the support;  
 a second switch contact part coupled to the rotary switch  
 actuator and in electrical connection with the first  
 switch contact part in a first angular and axial position  
 of the rotary switch actuator, and out of connection  
 from the first switch contact part in a second angular  
 and axial position of the rotary switch actuator; and  
 a third switch contact part coupled to the rotary switch  
 actuator and in electrical connection with the first  
 switch contact part in the second angular and axial  
 position of the rotary switch actuator, and out of  
 connection from the first switch contact part in the first  
 angular and axial position of the rotary switch actuator.
43. An electric switch as in claim 42, wherein:  
 said second and third switch contact parts are out of  
 connection from the first switch contact part in a third  
 angular and axial position of the rotary switch actuator.
44. An electric switch as in claim 42, wherein:  
 said switch includes a switch contact actuator coupled to  
 the third switch contact part and maintaining that third  
 switch contact part separated from the first switch  
 contact part in the first angular and axial position of the  
 rotary switch actuator.
45. An electric switch as in claim 42, wherein:  
 said first and second switch contact parts have arcuate  
 portions matching in the first angular and axial position  
 of the rotary switch actuator.
46. An electric switch as in claim 42, wherein:  
 said third switch contact part includes a projecting electric  
 contact in engagement with the first switch contact part  
 in the second angular and axial position of the rotary  
 switch actuator, and a switch contact actuator main-  
 taining the projecting electric contact out of engage-  
 ment from the first switch contact part in the first  
 angular and axial position of the rotary switch actuator.
47. An electric switch as in claim 46, wherein:  
 said switch contact actuator projects from the third switch  
 contact part toward the first switch contact part in  
 mechanical engagement with the first switch contact  
 part in the first angular and axial position of the rotary  
 switch actuator maintaining the projecting electric con-  
 tact out of engagement from the first switch contact  
 part; and  
 wherein the second axial position of the rotary switch  
 actuator is more remote from the first switch contact  
 part than the first axial position of the rotary switch  
 actuator whereby the switch contact actuator is in  
 disengagement from the first switch contact part in the  
 second rotary and axial position of the rotary switch  
 actuator and the projecting electric contact of the third  
 switch contact part is in electrical connection with the  
 first switch contact part in that second angular and axial  
 position of the rotary switch actuator.
48. An electric switch as in claim 42, including:  
 a rotary contact carrier coupled to the rotary switch  
 actuator and bearing the second and third switch con-  
 tact parts.
49. An electric switch as in claim 48, including:  
 an electric terminal coupled to at least one of said rotary  
 switch actuator and said rotary contact carrier.
50. An electric switch as in claim 49, wherein:  
 said rotary contact carrier has an aperture;  
 said first, second and third switch contact parts are clear  
 of said aperture; and  
 said electric terminal is contained within said aperture in  
 the rotary contact carrier.

51. An electric switch as in claim 42, wherein:  
said rotary switch actuator houses an electric load connected to one of said second and third switch contact parts.

52. An electric switch as in claim 51, including: 5  
a rotary contact carrier coupled to the rotary switch actuator and bearing the second and third switch contact parts and a further electric load connected to the other of the second and third switch contact parts.

53. An electric switch as in claim 52, including: 10  
an electric terminal coupled to at least one of said rotary switch actuator and said rotary contact carrier, and connected to said electric loads.

54. An electric switch, comprising in combination: 15  
a support;  
a rotary switch actuator threaded on the support for rotary and axial movement relative to the support;  
a first switch contact part on the support;  
a second switch contact part on the rotary switch actuator; 20  
and  
a third switch contact part coupled to the rotary switch actuator and in electrical connection with the first switch contact part and out of connection from the second switch contact part in a first angular and axial position of the rotary switch actuator, and in electrical connection with the second switch contact part, and out of connection from the first switch contact part in a second angular and axial position of the rotary switch actuator. 25

55. Apparatus as in claim 54, including:  
a push-button on/off actuator coupled to the third switch contact part in circumvention of said rotary switch actuator. 30

56. Apparatus as in claim 54, including: 35  
said second, switch contact part has a conducting resilient portion; and  
said electric switching arrangement includes an insulating spacer maintaining said resilient portion out of connection from said third switch contact part in said first angular and axial position of the rotary switch actuator; said resilient portion acting on said insulating spacer; and said rotary switch actuator releasing said third switch contact part into electrical connection with said conducting resilient portion in circumvention of said insulating spacer upon actuation to said second angular and axial position. 40

57. Apparatus as in claim 54, wherein: 45  
said third switch contact part has rest position between said first switch contact part and said second switch contact part in a third angular and axial position of the rotary switch actuator.

58. Apparatus as in claim 57, wherein: 50  
said electric switching arrangement includes a linear switch actuator connected to said third switch contact part.

59. An electric switch as in claim 54, including: 55  
a spring biasing said third switch contact part away from said first contact part; 60  
said third switch contact part having spaced contact portions engaging said first switch contact part against a bias of said spring in said first angular and axial position of the rotary switch actuator, and engaging said second switch contact part in said second angular and axial position of the rotary switch actuator. 65

60. An electric switch as in claim 59, including:  
an insulating spacer between said second and third switch contact parts in said first angular and axial position of the rotary switch actuator and in any third angular and axial position of the rotary switch actuator between said first and second angular and axial positions.

61. Battery-powered apparatus for holding and energizing an electric transducer producing an output from a battery current, comprising in combination:  
a hand-held battery housing having a pair of spaced internal battery terminal contacts;  
a transducer housing in the form of a block of electrically conductive material threaded to the battery housing and connected to one of said internal battery terminal contacts; and  
a switched electric transducer energizing circuit between the internal battery terminal contacts and the electric transducer.

62. Apparatus as in claim 61, wherein:  
said block of electrically conductive material has a reflector surface for the transducer.

63. Apparatus as in claim 61, wherein:  
said transducer housing includes a first surface and a terminal connected to said first surface and to said electrically conductive material.

64. In a flashlight, the improvement comprising in combination:  
a light source having a base;  
a light source energizing circuit having an electric switch for a light source in said energizing circuit;  
a part of said switch releasably fastened outside of said base to a support for said part of the switch; and  
said light source mounted on said part, whereby said light source is disposable with said part of the switch on which it is mounted;  
a replacement for said part of the switch; and  
a replacement light source mounted on said replacement for said part of the switch.

65. A flashlight as in claim 64, wherein:  
said switch has a switch actuator for said part on which the light source is mounted; and  
said part of the switch is mounted on said switch actuator as said support.

66. A flashlight as in claim 64, wherein:  
said flashlight has a reflector module;  
said part of the switch is mounted on said reflector module as said support; and  
said light source extends into said reflector module.

67. A flashlight as in claim 66, wherein:  
said reflector module is a switch actuator for said part on which the light source is mounted.

68. A flashlight as in claim 66, including:  
a module support bearing said reflector module;  
said reflector module movable relatively to said module support;  
said switch having a first contact on said module support and in said light source energizing circuit;  
said part of the switch having a second contact in engagement with said first contact in a first position of said reflector module relative to said module support and disengaged from said first contact in a second position of said reflector module relative to said module support; and

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said light source connected to said second contact in said light source energizing circuit.

69. A flashlight as in claim 68, wherein:

said part of the switch has a third contact in said light source energizing circuit;

said light source connected between said second and third contacts.

70. A flashlight as in claim 68, wherein:

said reflector module is threaded to said module support for rotational and axial movement relative to said module support;

said first position is a first rotational and axial position of said reflector module relative to said module support; and

said second position is a second rotational and axial position of said reflector module relative to said module support.

71. A flashlight as in claim 64, wherein:

said light source includes first and second lamps mounted on said part of the switch;

said part of the switch includes a first portion in said energizing circuit for switched energization of said first lamp, and a second portion in said energizing circuit for switched energization of said second lamp;

said switch has a switch actuator for said first and second portions of said part on which said first and second lamps are mounted; and

said part of the switch is mounted on said switch actuator as said support.

72. A flashlight as in claim 64, wherein:

said light source includes first and second lamps mounted on said part of the switch;

said part of the switch includes a first portion in said energizing circuit for switched energization of said first lamp, and a second portion in said energizing circuit for switched energization of said second lamp;

said flashlight has a reflector module;

said part of the switch including said first and second portions is mounted on said reflector module as said support; and

said first and second lamps extend into said reflector module.

73. A flashlight as in claim 72, wherein:

said reflector module includes a reflector having a focal point;

said first lamp has a filament at said focal point; and

said second lamp extends into said reflector on a side of said first lamp.

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74. A flashlight as in claim 73, including:

a refractive lens for said second lamp.

75. A flashlight as in claim 72, wherein:

said reflector module is a switch actuator for said first and second positions of said part on which said first and second lamps are mounted.

76. A flashlight as in claim 72, including:

a module support bearing said reflector module;

said reflector module movable relatively to said module support;

said switch having a first contact on said module support and in said light source energizing circuit;

said first portion of said part of the switch having a second contact in engagement with said first contact in a first position of said reflector module relative to said module support and disengaged from said first contact in a second position of said reflector module relative to said module support;

said second portion of said part of the switch having a third contact in engagement with said first contact in a third position of said reflector module relative to said module support and disengaged from said first contact in another position of said reflector module relative to said module support;

said first lamp connected to said second contact in said light source energizing circuit; and

said second lamp connected to said third contact in said light source energizing circuit.

77. A flashlight as in claim 76, wherein:

said part of the switch has a fourth contact in said light source energizing circuit;

said first lamp connected between said second and fourth contacts; and

said second lamp connected between said third and fourth contacts.

78. A flashlight as in claim 76, wherein:

said reflector module is threaded to said module support for rotational and axial movement relative to said module support;

said first position is a first rotational and axial position of said reflector module relative to said module support;

said second position is a second rotational and axial position of said reflector module relative to said module support; and

said third position is a third rotational and axial position of said reflector module relative to said module support.

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